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The value of R or the tractive power on a level, is 11,160 lbs., or $9\frac{2}{10}$ lbs. per ton.

The angle of friction is $\frac{9.2 \times 5280}{2000} = 24.28$ feet per mile.

The adhesion is $\frac{11,160}{53,000}$ or nearly one-fifth of weight on drives.

From the data thus obtained a simple formula may be found to determine the load of the engine on any given inclination, a.

Let P = tractile power of engine on a level = 11,160 lbs.

a = feet per mile of inclination.

W^1 = weight of train on incline a, including engine and tender.

Then $W^1 \times 9.2$ = power required to move W^1 on level.

And $W^1 \frac{a}{5280}$ = gravity on incline a, in tons or $W^1 \frac{2000}{5280}$ a, in pounds.

$9.2\, W^1 + \frac{2000}{5280} W^1 a$ = power of engine = 11,160 lbs.

Or $W^1 = \frac{11,160}{9.2 + .38a}$

If a be supposed equal to 48.56, or twice the angle of friction, the load would be 404 tons nearly, or one-third the load on a level.

On a grade of 30 feet the load would be 541 tons. The grade that would require double the power of a grade of 30 feet would be 84½ feet.

If the gross load of a train on a grade of 30 feet be 541 tons, the engine and tender being 63 tons, the cars and contents will weigh 478 tons, or if 18,000 lbs. be allowed for each car and 22,000 lbs. for load, the number of cars will be 27 and the net load 297 tons, weight of cars 243 tons.

If the return cars shall be only one-fourth loaded, which is probably a full proportion for the Shenadoah Valley extension, the gross weight of the trains would be 380 tons.

The inclination that would employ the full power of the engine in hauling 380 tons, would be 53 feet.

The inclination that would employ the full power of an assistant engine in hauling a gross load of 380 tons, would be 130 feet, but allowance must be made for the weight of the assistant engine.

The following description of Indian sculpture on the banks of the Monongahela River, by Jos. D. Reid, was received through Prof. Cope, accompanied by a drawing of the same.

SKETCH AND DESCRIPTION OF A CARVED ROCK *on the bank of the Monongahela River, Pa.,* by JOSEPH D. REID.

(*Read before the American Philosophical Society,* Jan. 20, 1871.)

The engraving represents the face of a large rock lying on the east bluff of the Monongahela River, in Fayette County, Pennsylvania, opposite the village of Millsborough and the mouth of Ten Mile Creek.

Originally there were three rocks, but after the settlement of the country, two of them were broken up and used in building a mill dam. At that time no one valued or took any interest in them, so no record was kept other than the fact that they were larger, and the figures more numerous than on the one remaining. This is in its original position, partly buried in the earth and so worn by the elements that the figures have become indistinct, and some perhaps entirely obliterated.

The Indians that inhabited this part of the conntry at the time of its settlement by the whites, had no legend connected with the rock, nor had they used it for any purpose. The river bank at this point and for a mile above and below is nearly a perpendicular bluff, three hundred feet high, which is broken by a single ravine, and up this by a narrow winding path, apparently made by the same people that carved the figures on the rock, it may be reached directly from the river. A carriage road that leaves the river opposite Fredericktown, and winds around behind the bluff, passes within a few hundred yards of it.

The rock is sandstone, of the same formation as that overlying the coal bed below; the surface is nearly flat, of an area of twenty by twenty-four feet, with a depression diagonally across, in a line with the three cups or hollows, the largest of which is one foot in diameter, the middle one six inches, and the other three inches, and about the same in depth. The depression or gutter and cups, are discolored, apparently by the blood of the victims that the inhabitants offered as sacrifices to their deity.

The south end of the rock is three feet above the ground, with a hog-like figure carved upon it. The foot and hand prints are deeper and more perfect than the other figures, and in no way can I better describe them than they present the appearance of having been made by pressing the naked feet and hands upon soft clay, so perfect are some of the impressions. This is particularly the case with one foot-print, with a large toe on each side of the foot, and a hand-print with a thumb on both sides.

The largest impressions of feet measure fourteen inches in length, eight inches across the toes, and four inches across the heel, the other foot-prints vary in size from that of a full grown man to a child five years of age; the foot-prints of squirrels are numerous and cross the rock in every direction, not all that were on the rock being represented in the engraving. A single track of an animal with claws, and one intended to represent a buffalo track, but too small and no division of hoof, are also on the rock. The bird tracks are quite distinct and six inches in length; the three links have apparently been made recently. The other figures are outlines, and whether made as a pastime by some Indian artist or as the hieroglyphic history of an Indian race, I leave others to determine.

Two miles down the river from the rock is the site of an old Indian town and grave-yard, which covers an area of fifteen or twenty acres. There may be found pieces of sun dried pottery made of clay and minute fragments of muscle shells, pipes of the same material, and some of soap stone, axes of red ?jasper as hard as steel, arrow heads of flint, and circular flat sandstones, two of six inches in diameter and from one-fourth of an inch to one inch in thickness, some of them with a hole in the centre and with a worn appearance of the edge.

The graves are covered with flat stones taken from the cliff above the town; they were placed about two feet below the surface, and being out of reach of the plow, the graves are seldom disturbed; one opened a few years since, exposed the skeleton of a female in a sitting position with a child in her arms, the skull of the child stuck to the stone, and when exposed to the air for a few minutes a slight puff of wind carried it away in a little cloud of dust. The skeletons are found in a sitting position facing the east and after being exposed a short time fall to dust. Nothing besides pieces of charcoal have been found in the graves with the bones. (See Plate I.)

The following members were nominated and elected to serve on the Standing Committees for the year:—

Finance.—Mr. Fraley, Mr. E. K. Price, Mr. Marsh.

Publication.—Prof. Trego, Mr. E. K. Price, Dr. Carson, Mr. Fraley, Mr. W. M. Tilghman.

Hall.—Gen. Tyndale, Mr. E. Hopper, Mr. S. W. Roberts.

Library.—Dr. Bell, Dr. Coates, Mr. E. K. Price, Dr. Carson, Dr. Krauth.

On motion of the Secretary, the reading of the list of members was postponed to the next stated meeting.

Pending nominations Nos. 661 to 668, and new nominations Nos. 669, 670, were read.

Balloting then proceeded; and there being no other business, the ballot-boxes were examined by the presiding officers, who declared the following named persons duly elected members of the Society:

M. Esquirox de Parieu, of France.
Mr. W. T. Roepper, of Bethlehem.
Rev. W. C. Cattell, of Easton, Pa., Pres. Lafayette Coll.
Mr. H. M. Phillips, of Philadelphia.
Mr. Thos. Meehan, of Germantown.
Gen. George G. Meade, of Philadelphia, U. S. A.
Lieut. C. E. Dutton, of Frankford, Pa.
Mr. Ed. Goodfellow, of Philadelphia, U. S. Coast Survey.

And the Society was adjourned.